



Guided Experiential Learning: Training Design and Evaluation

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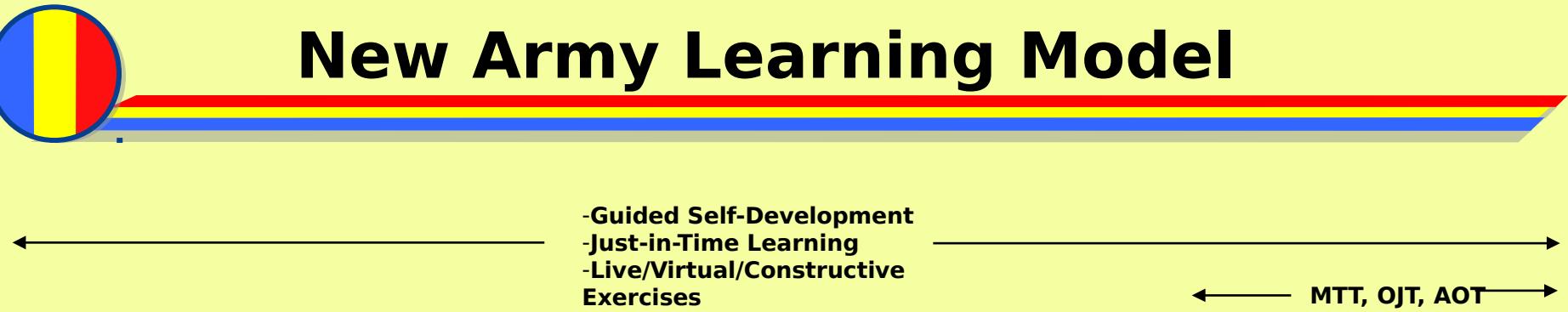


Agenda

- **ADCSOPS&T Guidance**
- **New Army Learning Model**
- **Army Performance Improvement**
- **Foundations of GEL**
- **Components of Design Models**
- **Components of GEL Instruction**
- **Overview of GEL Design**
- **Using Guided Experience to Design Courses**
- **Job Aids**
- **Summary**

- **(Mar 04) Update TD process**
 - Go anywhere, get help from anyone, no sacred cows
 - Take about 2 years
- **(Mar 05) Execute dL Contracts to Train TDers**
 - Use Performance Improvement Center of Excellence to model dL process
 - Approved for start-up at ATSC in FY 05

New Army Learning Model



Phase I: dL at TRADOC Schools

**Option to complete at home station.
Most will complete Phase I at TRADOC.**

Knows: Common terms, facts, basic concepts, basic principles (entrance requirement)

Diagnostic Testing: Writing, reading, tactics, etc. (entrance requirement)

Common content: Common core & mandatory training (graduation requirement)

Phase II: Classroom Instruction

Blend of dL & f2f

- dL for nights, weekends, & planned weekday periods
- f2f maximizes integrated performance-based instruction (e.g. hands-on, CPX, FTX, capstone)



-Shared challenging exercises build cohesion.

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Phase III: Learning at Unit

Graduation Requirement:
Student responsibility to complete common content

Provide for Transfer

- Sustainment via dL (e.g. feedback multi-media)

Supervisor provides feedback for course improvement

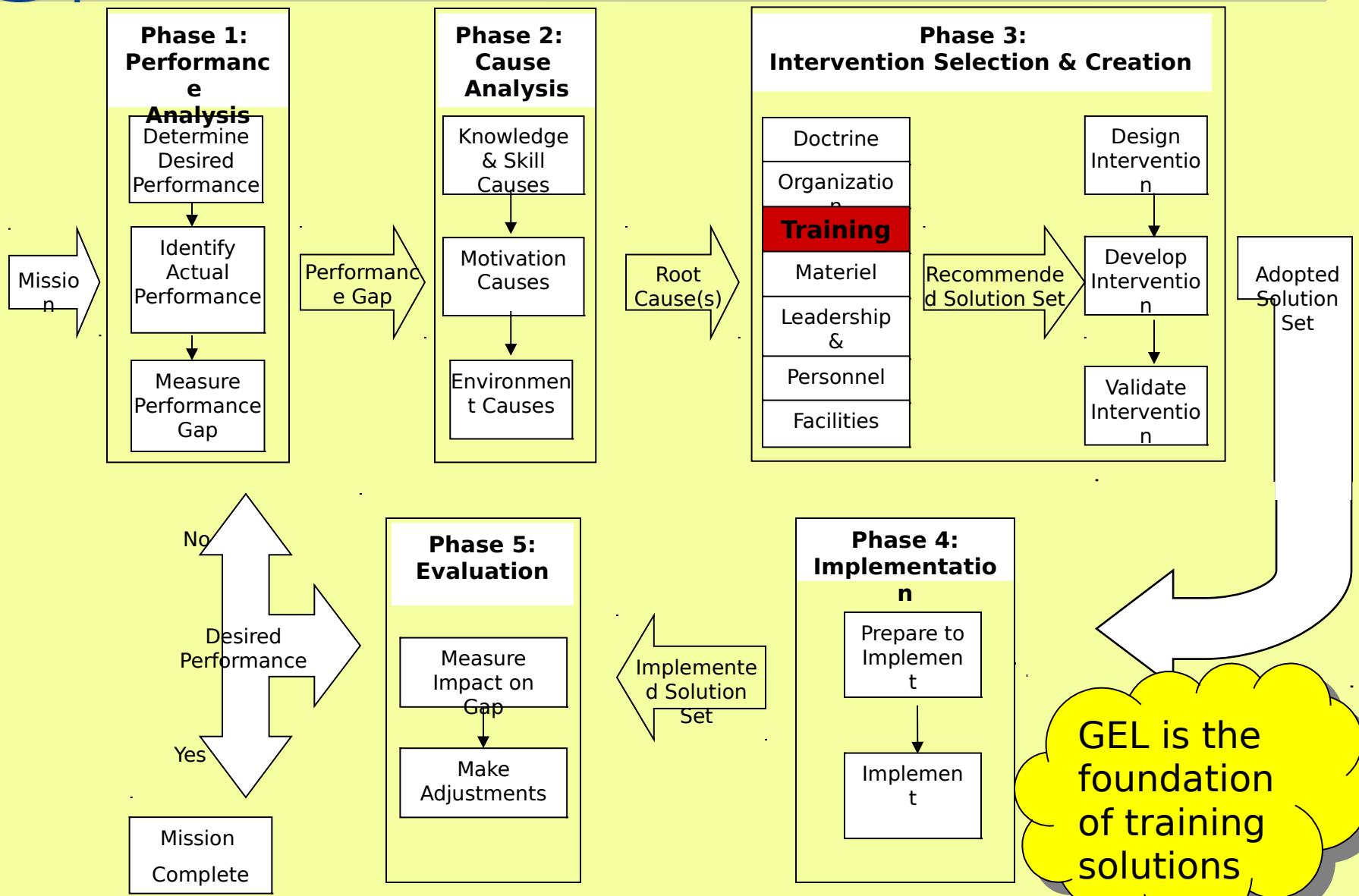




What is Army Performance Improvement?

- Based on Human Performance improvement:
- Structured methodology to align TD mission with business goals:
 - seek and destroy impediments to efficient mission accomplishment
 - implement the correct interventions (DOTMLPF)
 - measure performance improvement rather than adherence to SAT process

Army Performance Improvement Process Diagram





Three Foundations of GEL

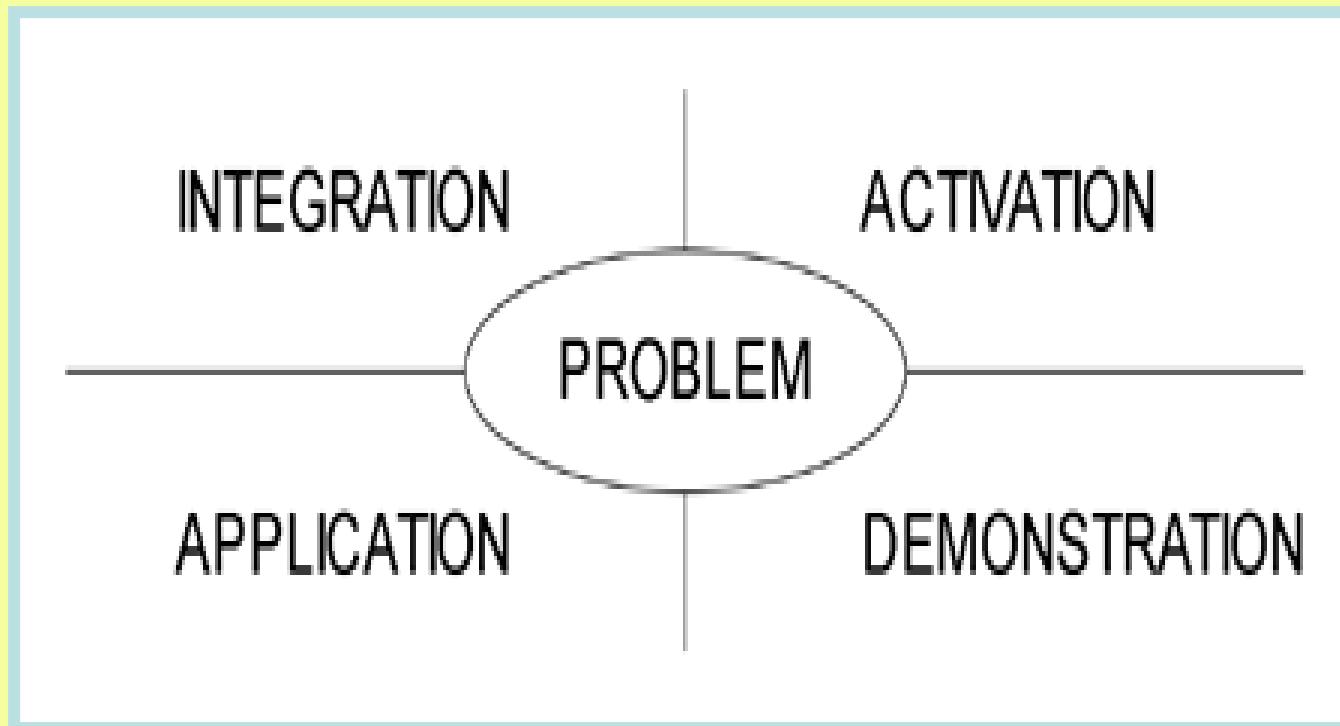
- **Office of Naval Research Review of most effective pedagogical strategies for DL**
“What works in DL” (2004) O’Neil (Ed.) Infoage.
- **Merrill’s “First Principles” review of best design models (ETR&D, 2002, 50[2], 50-59)**
- **Mayer and Reiser et al critiques of “Discovery Learning” and unguided problem-based learning (Mayer, R, 2004; “Three Strikes Rule”, American Psychologist, 59(1).**

Reviewed 30+ models and identified five components that were common to all effective models:

- 1. Solve real problems from field**
- 2. Activate relevant prior knowledge**
- 3. Demonstrate how to solve**
- 4. Apply what is learned by solving**
- 5. Integrate learning so that it reflects real field conditions**



Five Most Important Elements of Design Models





Five Components of GEL Instruction

1. Goals (what trainees will be able to do)

- You will learn how to (REMEMBER, DO, APPLY...)

2. Reasons (Benefits and Risks)

- Value of learning - consequences of not learning
- What you already know that you should use

3. Overview (What you need to know)

- Teach new concepts and processes needed to learn procedure
- Give job aid's based on CTA procedure

4. Demonstration (of the procedure)

- Worked examples of problems using CTA procedure
- Use integrated visuals and sound (narration)
- Instructor or Model should be credible, similar

5. Practice and Feedback.

- First show easy problem and solution - ask for questions - do not focus on errors but on "correcting strategies"
- Second, next easy problem and half of solution
 - Ask trainees to complete it for practice
 - Focus them on job aid for reminders
- Third, give moderate problem and $\frac{1}{4}$ solution
- Fourth, moderate then complex and ask them to solve
- Gradually fade support - training wheels come off!



Overview of DL Design

Select Goals
& SME's



Identify Many Job and
Mission Problems



Cognitive
Task Analysis



Design Blueprint

- Sequence Lessons
- Design each lesson with
 - Goals and Reasons
 - Background
 - Demonstration, practice & feedback
- Design Job Aids for transfer



Information

- How to act and decide
- New concepts, processes
- Equipment and materials
- Performance standards



Select delivery media



Evaluation

- Four level evaluation
- Test of prior knowledge
- Transfer letters

Select Course
& SME's

Identify Many Job and
Mission Problems

Cognitive
Task Analysis

Problem Selection and Examples

- **Identify goals and experience level of trainees**
- **Work with 2 experienced SME (beyond MOS)**
- **Identify six large, authentic field problems**
 - From Easy to Moderate to Difficult
- **Create “worked examples” of the problems**
 - Use cognitive task analysis information
 - Starting conditions, procedure and output?
 - Solutions must be understood by trainees

Select Course
& SME's ➔

Identify Many Job and
Mission Problems ➔

Cognitive
Task Analysis

Cognitive task analysis

Interview expert and ask:

- **Outline tasks in order performed in field**
- **For each task:**
 - **What must happen for task to begin?**
 - **List actions and decisions for every team member**
 - **Capture new concepts and “how it works” processes**
 - **List necessary equipment/material**
 - **List performance standards (speed, accuracy)**
 - **Review analysis for accuracy and revise**

Cognitive Task Analysis - Second SME

- Interview second SME and ask them
 - Can you suggest better problems?
 - Review for accuracy (Can it be done this way?)
 - Review for efficiency (Is there a quicker way?)
 - What has been forgotten?
- Repeat with third SME if possible
- Produce printed copy of all procedures for each task with related starting conditions, steps, equipment & standards

Identify

- How to act and decide
- New concepts, processes
- Equipment and materials
- Performance standards

Design Lessons

- Sequence groups of problems/tasks into lessons
 - First performed in field are first taught
 - If no fixed sequence, easy before difficult
- Develop goals for each lesson
 - Remember concepts, processes
 - Remember conditions and consequences
 - Perform procedure in the field
- Design job aid's based on procedure

Design

- Sequence Lessons
- Design each lesson with
 - Goals and Reasons
 - Background
 - Demonstration, practice & feedback
- Design Job Aids for transfer



Job Aids

- **Where possible, summarize all key procedures for trainees to use while learning**
- **Job aids are not “cheating” they are “training wheels” that help trainees during practice**
- **Remove the job aids as they succeed at practice**

Select delivery media →

Evaluation

- Four level evaluation
- Test of prior knowledge
- Transfer letters

Media Selection, Evaluation and Transfer

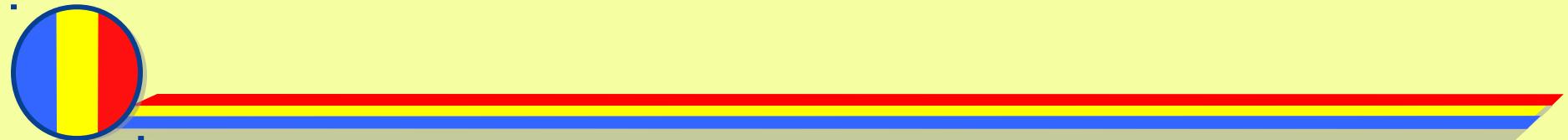
- Select media based on context, practice and cost
- Evaluate on four levels
 1. Reactions (motivation - confidence, value)
 2. Learning (use practice exercises to evaluate)
 3. Transfer (check with supervisor/commander)
 4. Impact (did it make a difference to bottom line?)
- Send letter to commander asking for transfer help



Summary

Despite more up front time and effort required for Guided Experiential Design and delivery:

- **Amount learned increases**
- **Learning time decreases**
- **Learners like it as well as pure immersion**
- **Involves “authentic” settings and tasks**
- **Transfers to the field and reduces application errors**



- Back up

Comparing GEL to Unguided learning

**Three training groups (50 adults in each group)
learning to use Excel Spreadsheet:**

- 1. Unguided Experiential learning lesson**
- 2. Standard “features” training from Excel**
- 3. Guided Experience - Model we will discuss**



Comparing GEL With Other Design Systems

Merrill's study of pure, guided and standard training to use excel spreadsheets

	Learning	Time	Satisfaction
Pure	34%	60 min+	High
Standard	68%	49 min	Low
Guided	89%	29 min	High



Four Training Misconceptions

- 1. Use of Multimedia and Games increase learning and motivation**
 - **Training methods influence learning, NOT media**
 - **Motivation caused by beliefs NOT media**

- 2. SME's give accurate information that is useful to trainees**
 - **SME's describe “what” not “how”**
 - **Leave out about 80 percent of “decisions”**

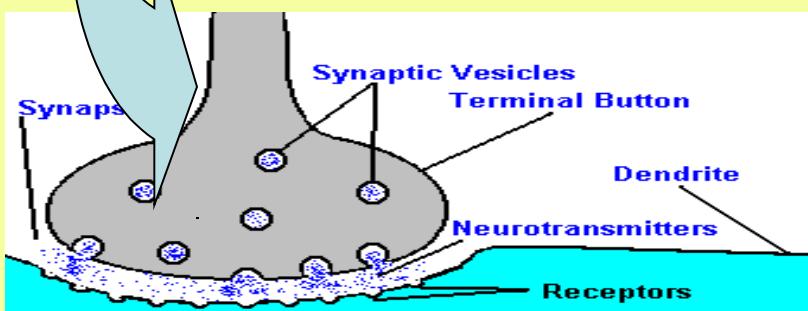
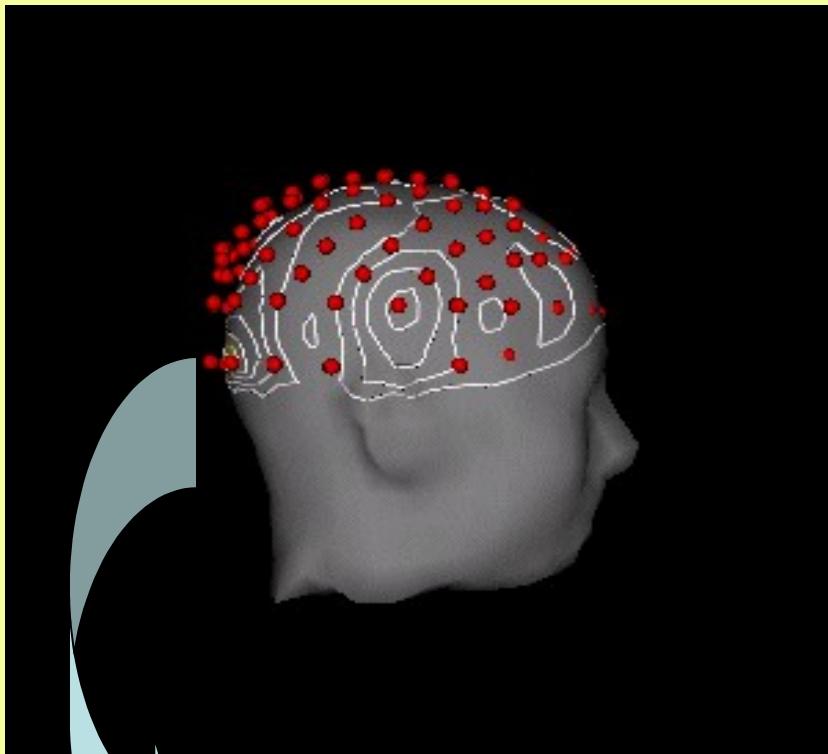


Four Training Misconceptions

- 3. Behavioral task analysis will capture the way experts make decisions and solve problems**
 - Cognitive task analysis captures complex decision-making knowledge of all types
 - Can be used to provide complete learning guidance
- 4. Learning Styles help us shape different training for different trainees**
 - Meyer's Briggs and visual/verbal learner measures do not work
 - Only trainees with different levels of prior knowledge and motivation need different types of instruction



Mental Architecture for Learning



The mind is structured to protect existing knowledge and to learn new information.

Training must overcome the protective devices and support mental strategies that aid learning



Mental architecture influences on learning

- 1. We have a very limited thinking space, easily overloaded to protect us from scrambling our brain (ONLY 3 +/- 2 “chunks”/or ideas at one time)**
 - When overloaded, our brain “short circuits” and stops learning
 - Overload is not noticed - may be enjoyable
 - To overcome this limit we have two different but interacting knowledge systems
- 2. Two types of knowledge systems compensate for limited “thinking” space**
 - A) Declarative (What and Why)**
 - Conscious, easily learned and changed, can be wrong - designed to handle novelty, uncertainty
 - B) Procedural (When and How)**
 - Unconscious, difficult to learn and change, can't be wrong - designed to circumvent limits on consciousness



Mental Architecture

3. Once we accept a new goal, our “learning system” architecture is structured to select and/or develop a procedure for achieving it.

- General learning procedures include:
 - Plans to achieve the goal
 - Connections to relevant prior knowledge,
 - Ways to select the important and ignore the rest
 - Self monitoring for accuracy and results feedback
 - Procedures for using feedback to tune the plan

4. Successful training provides clear goals and supports the learning strategies that trainees can't or won't provide for themselves.

- Provide a clear “3C” goal (concrete, current, challenging),
- Motivate them to accept and persist at achieving it
- Show how with “worked example” including decisions
- Immerse in a variety of realistic examples - starting simple and gradually becoming realistic
- Support their learning strategies as they develop their own version of a procedure



Training Design Reflecting Mental Architecture

- **Cognitive Task Analysis gives accurate and complete information on all actions and decisions needed**
- **Complete information must be embedded in learning plans with demonstrations, practice and feedback**
- **Think of immersive simulations and games as a basis for demonstrations and practice of skills until they automate**